

Elkhorn, Walworth Co., 30th: the continued drought has caused great damage to crops in this county; in some parts of the county but little rains has fallen during the last seven weeks.

Burlington, Racine Co., 30th: the drought has practically destroyed all crops in this vicinity. The leaves have fallen from the willow trees in the lowlands, and tassels are coming out on the corn, although it is but two feet high.

La Crosse, 30th: the month of June, like May, is characterized by its high mean temperature (which is only exceeded by that of June, 1873) and the unusually small amount of rainfall, 0.98 inch, making it the driest June ever known. The severe drought prevailed from the beginning to the end of the month; it was not checked by the light showers of the 12th, 13th, 14th, 18th, and 20th. The condition of crops is diversified; while hay and winter wheat are being harvested fifteen days earlier than usual, with a very poor yield, the condition of corn is very good.

Chicago, Ill., 30th: the drought which prevails in the northern and central tiers of counties in this state is not more severe than it is in Wisconsin. In this latter state fruit and crops are nearly destroyed, and in some towns the authorities have taken steps to insure the economical use of water. Reports from northwestern Iowa state that the drought in that region has been broken by recent showers.

The "New York Herald" of July 2d contained the following:

The outcry that comes from the Northwest on account of the drought in the "wheat belt" is not groundless. The growing grain has suffered seriously from the June deficiency of rain, which must tell upon the yield of the harvest in a considerable area of the country.

Happily, however, the cry of distress from the Northwest was answered yesterday by local rains in the upper Mississippi valley and near the western lakes. The showers were not heavy enough in the drought-stricken districts to satisfy the parched and dusty fields, but they were helpful, and the meteorological conditions now give some promise of further rainfall in the regions of severest drought within the next two days.

WINDS.

The most frequent directions of the wind during June, 1887, are shown on chart ii by arrows flying with the wind; on the Atlantic coast north of Virginia they were southerly, and from Virginia southward they were mostly from the north; in the Gulf States and central valleys, southerly; in the Lake region, Rocky Mountain districts, and on the Pacific coast they were variable.

HIGH WINDS (in miles per hour).

Wind-velocities of fifty or more miles per hour, (on mountain stations at or exceeding seventy miles) other than the maximum velocities for the month, which are given in the table of miscellaneous data:

Fort Totten, Dak., 50, s., 26th.

Pike's Peak, Colo., 72, sw., 5th; 72, w., 26th.

Mount Washington, N. H., 72, w., 16th; 70, nw., 17th.

LOCAL STORMS.

Pamplin City, Appomattox Co., Va.: a destructive hail and wind storm passed over this section on the afternoon of the 1st; it appears to have been most severe at a point five miles west of this place, where the crops were seriously injured.

Charlotte, N. C.: quite a severe storm, accompanied by hail, occurred at this place between 5 and 6 p. m. on the 1st. The wind attained a maximum velocity of forty miles per hour at 5.28 p. m.

Knoxville, Tenn.: heavy rain, with hail at intervals, fell from 11.15 a. m. to 12.20 p. m., and from 1.40 to 5.25 p. m. on the 1st. This storm was the severest that has occurred at this place during the current year, and considerable damage was done to crops in the surrounding country.

Marquette, Mich.: the storm which occurred during the night of the 7-8th caused considerable damage to streets, sewers, and unfinished buildings in this city.

Mr. A. Pendleton, voluntary observer at Nicolaus, Sutter Co., Cal., furnishes the following report of a hail storm of remarkable severity which occurred at that place on the 12th:

The hail storm of the 12th was the most violent and disastrous that ever occurred here. The length of time during which hail was precipitated was over three hours (beginning at 1.30 p. m.), a feature of the storm which, also, has no precedent in this vicinity, if in the state. When done falling nothing in the shape of vegetation was free from the traces of the storm. Whole fields of barley were stripped entirely clean of the heads, and nothing was left standing but the bare straw. In other fields the grain was knocked flat to the ground, with only, here and there, a head remaining on the stalk. With wheat fields the effect was the same, except that the destruction was not quite so complete, owing, most likely, to its being not quite so far advanced as the barley. What fruit was not pounded off the trees was picked full of holes, so that it resembled the effect of a charge of shot. Corn was stripped as with a knife, and every sort of vegetable suffered. Chickens, birds, rabbits, gophers, young pigs, etc., were found lifeless in quantities after the storm.

The temperature rapidly fell to 50°, and the ground soon became white with hail. For two hours the hail and rain continued to fall with unabated vigor

until it lay three inches deep on the ground, and the streets were like rivers. In places like the intersection of roofs the hail piled up to the depth of eighteen inches, and could have been gathered by the ton. It varied in size from peas to walnuts, and was of all shapes, and generally bearing the characteristic, noticed before, of being frozen solid on one side and imperfectly congealed on the other.

At 3 p. m. an attempt was made to reach the rain-gauge, which is situated on a roof twenty-four feet from the ground. But the wind (which at that time had increased to sixty miles per hour), rain, and hail drove the observer back, but not until he had seen the gauge full and running over. Its capacity is 1.70 inches, so more than that amount had fallen in an hour and a half. It is safe to say that the amount precipitated during the storm was three inches, nearly an inch an hour for the three and a half hour's fall. The wind during the last hour fell to fifteen miles, and hauled to east, the temperature rising at 4 p. m. to 53°.

Observers situated a mile or more from the river saw two clouds, one seemingly above the other, which came together over the town and adjacent country at the time of the greatest fall. For a distance of five miles below town to the same distance above, the hail was felt in its severity, extending back from the river a varying distance of from a half a mile to two miles. Nearly every growing thing in the limits of this district suffered more or less, the loss, in all probability, reaching \$50,000. It is fortunate that the storm spent its fury before reaching the extensive wheat fields east of the river, as the damage would have been incalculable. Most of them got a severe drenching, but escaped with a loss variously estimated at from five to ten per cent. and the delay of harvesting it. Doubtless the storm will go on record as the severest ever experienced in California in the month of June.

Dodge City, Kans.: a thunder-storm began at 6 p. m. on the 16th and continued until 10.20 p. m. The rainfall was very heavy, amounting to 3.00 inches in two hours and forty minutes, and caused much damage by flooding streets and cellars. Small hail fell at intervals during the storm.

Port Huron, Mich.: from 5.10 to 9.20 p. m. on the 17th a thunder-storm, accompanied by hail, prevailed at this place, the wind reaching a maximum velocity of thirty-six miles per hour, from the west, at 5.54 p. m. Several windows were broken by the hail in this city, and farmers from the surrounding country state that crops were considerably injured by hail.

Hudson, Lenawee Co., Mich.: a very severe wind storm from the northwest occurred during the afternoon of the 17th, causing much damage to trees.

Henry, Codington Co., Dak.: gardens and crops to the east of this place were damaged by a hail storm which occurred on the 18th.

Baltimore, Md.: a severe storm, accompanied by hail and high wind, occurred between 4 and 5 p. m. on the 18th. About half an inch of rain fell in a few minutes, causing some light damage.

Petersburg, Va.: reports from Northampton county, N. C., state that during the night of the 18-19th a violent storm caused much damage in that county to fruit trees, fences, barns, and other out-buildings. The very heavy rain caused much injury to crops.

Elkton, Cecil Co., Md.: a severe thunder-storm, accompanied by hail, occurred in the upper part of this county during the night of the 19-20th. Hail fell in sufficient quantity to cover the ground. Several buildings were struck by lightning, and considerable damage was done to crops.

Massey, Kent Co., Md.: a thunder-storm, accompanied by hail, occurred at Millington and vicinity, in this county, during the evening of the 19th. Considerable damage was done by lightning.

Lebanon, Lebanon Co., Pa.: A violent storm of rain and hail passed over this county during the evening of the 19th; it was especially severe along the line of the Lebanon Valley Railroad, between Richland and Myerstown. At the former place hailstones fell which measured one and a half inches in diameter, and in the vicinity of Myerstown trees were uprooted and the roads badly washed. Great damage was done to crops.

Lancaster, Lancaster Co., Pa.: between 5 and 6 p. m. on the 19th a violent rain and hail storm prevailed in this city and

Report of tornadoes for the month of June, 1887, by 2d Lieutenant John P. Finley, Signal Corps, Assistant.

Place.	Date.	Time.	Direction.	Form of cloud.	Number of persons killed.	Number of persons wounded.	Width of path in feet.	Number and kind of animals killed.	Number and kind of buildings destroyed.	Total valuation of property destroyed.	Authority.
Green county, Tenn. a	1	Afternoon	ne.	Funnel	None	2	450		30, mostly barns and out-buildings.		Knoxville, Tenn., "Journal."
Carroll and Campbell counties, Ga. b	1	7.10 p. m.	e.	Funnel	None	2	300 to 450		Many buildings		M. B. Russell, Carrollton, N. H. Ballard, Palmetto, C. B. Brogden, Brogden, Ga.
Near Newnan, Ga. c	1	7 to 8 p. m.	ne.	Funnel	1	1	100 to 900	1 cow	11 buildings		J. E. Willett, Macon, Ga.
Brunswick, N. C. d	1	4 to 5 p. m.	ne.		None	None	2,640	Several head of cattle.	Demolished barns and fences, twisted off trees.		Muttie C. Chamness, Brunswick, N. C.
Green district, W. Va. e	1	7 p. m.	ne.				5,280		Very destructive to timber.		E. E. Headlee, Porter's Falls, W. Va.
Brackettown, N. C. f	1	Evening	se.			Several	300		Several houses, timber prostrated, and crops ruined.		A. L. Grayson, Rutherfordton, N. C.
Cove Mountain, Pa. g	2	Morning	w. of n.				300		Destroyed everything in its path.		J. S. Shade, McConnellsburg, Pa.
Near Belvidere, N. C. h	2	9 p. m.	ne.	Funnel	None	None	300 to 450		Unroofed buildings, twisted off trees 15 to 24 inches in diameter.		J. Nicholson, Belvidere, N. C.
Shawneetown, Ill. i	3		ne.		3		Narrow		One		C. J. Lemen, Shawneetown, Ill.
Near Lead Hill, Ark. j	4	4.30 p. m.	ne.	Funnel			300 to 1,320		Twisted off trees and caused great destruction when ever it struck the ground.		S. C. Turnbo, Pro Tem, Mo.
Blue Creek, W. Va. k	5		ne.	Funnel	None	None	Narrow	1 horse	Several houses.		N. A. Duffield, Rock Castle, W. Va.
Near Waco, Tex. l	6	Afternoon			None	None	150		Demolished several houses.		L. M. Kingsley, Bosqueville, Tex.
Twelve miles north of Jamestown, Dak. m	6	5 p. m.	ne.	Funnel	None	None	Narrow		No buildings in track		R. A. Bill, Jamestown, Dak.
Twelve miles northeast of Huron, Dak. n	7	3.10 p. m.	ne.	Funnel							Signal Service observer, Huron, Dak.
Salina, Kans. o	8	5 p. m.	ne.				Narrow	1 horse and a large number of poultry.	1 dwelling, several barns		Dr. J. F. Llewellyn, Mexico, Mo.; J. N. Gibson, Salina, Kans.
Kansas City, Mo. p	10	9.30 a. m.	ne.	Funnel							"New York World," June 11, 1887.
McDowell county, N. C. q	13		ne.	Funnel					Several houses demolished and fences and prostrated.		L. B. Schmidt, Le Roy, Kans.
Grand Forks, Dak. r	16	3.22 p. m.	easterly		4				50 or more buildings, besides hundreds of barns, out-houses, &c.	\$150,000	M. B. Young, Grand Forks, I. N. Johnson, Milan, W. E. Boise, Bellevyria, Dak.
Maywood, N. C. s	18	3 p. m.	se.	Funnel	None	None	5,280		Very destructive to crops.		A. T. Smith, Maywood, N. C.
Keystone, Minn. t	18	10.30 a. m.	e.						Timber prostrated.		Alex. Jorgenson, Keystone, Minn.
Falun, Kans. u	20	5.30 p. m.	ne.	Funnel	None	None	47		No damageable property in path.		J. N. Gibson, Salina, Kans.
Salina, Mo. v	20	5.15 p. m.	ne.	Funnel	None	5			Very destructive to buildings, orchards, and crops.	68,000	H. B. Collins, Salina, Mo.
Nottoway and Amelia counties, Va. w	21		ne.		None	None			Granaries, barns, and out-buildings destroyed, orchards ruined, and timber prostrated.		Baltimore "Sun," June 23, 1887.
Killeen, Tex. x	21	10 p. m.	south'y		None	None			School-house, Masonic hall, and several dwellings.		W. P. Powell, Holland, Tex.
Wilmington, Del. y	22	12.40 p. m.	ne.	Funnel	3	Several	Narrow		17 buildings totally destroyed and 38 badly damaged.		W. A. Eddy, New York City; "New York Times."
West Almond, N. Y. z	24	6.10 a. m.	ne.		None	None					Dr. C. H. Sharp, West Almond, N. Y.
Longview, Tex. aa	26	Evening	ne.	Funnel	8				Several houses		"Globe Democrat," Saint Louis, Dr. J. F. Llewellyn, Mexico, Mo.

a Cloud approached with a loud roar.

b The cloud appeared to be above forty feet wide at the top and one hundred feet high, tapering to a point at the bottom, moving at a rapid pace with a roar.

c Cloud formed in the southwest and moved rapidly.

d A revolving, black cloud, moving with a roaring noise.

e Cloud accompanied by a terrific roar.

f Cloud very angry looking.

g The funnel cloud was of a white, milky color and moved rapidly.

h Cloud very black and moved rapidly.

i Three funnel-shaped clouds projected from a bank, the sky being perfectly clear on all sides of the main cloud; five minutes later a pipe-like cloud seemed to rise from the earth to the funnel-shaped cloud. The column was at first narrow, but gradually began to widen, first at the ground and then at the upper end.

j Cloud did not reach the earth at this point.

k A tuft of lead-colored cloud rose from a black stratum, whirling rapidly, and met with a jet from above. After the rotary motion had continued for some time the funnel-shaped cloud broke and disappeared; it did not touch the earth.

l A black cloud, accompanied by a deafening roar.

m A whitish colored, funnel-shaped cloud of great length, projecting from a bank of cloud, swaying back and forth, accompanied by a roaring noise.

n The cloud seemed to sweep the ground, and advanced, whirling at a fearful rate, but its movement of progression was slow.

o The clouds moved rapidly from all directions toward the tornado cloud, which was revolving rapidly, raising and lowering alternately. The lower end of the funnel was streaked with green, bordered on each side by red bands.

p A dark, funnel-shaped cloud formed in the southwest, with a curiously shaped cloud on either side; the three clouds joined, when a great commotion ensued, the entire mass moving off at a furious velocity.

q Cloud intensely black, about one-half mile in width; it did not touch the earth, but had a rotary motion.

vicinity, causing great damage. The hail-stones were as large as walnuts and fell for nearly half an hour. The various crops and fruit were much injured, and hundreds of panes of glass were broken.

Easton, Pa.: during the evening (about 10 p. m.) of the 19th a destructive storm occurred in this vicinity. Trees were uprooted, and the heavy rainfall caused much injury to the roads and growing crops. Considerable damage was done by lightning.

Wilkesbarre, Pa.: a severe storm of rain and hail prevailed here during the afternoon of the 19th, causing considerable damage to crops in the surrounding country. In the northern part of Wilkesbarre a large frame building was destroyed.

Reading, Pa.: a severe storm passed over this section during the night of the 19-20th. The heavy rains caused the flooding of many cellars, and in the surrounding country the grain fields were levelled and fruit was severely cut by hail. The storm was accompanied by a very remarkable electrical display.

Booneville, Cooper Co., Mo.: the heaviest rain storm of the season occurred here at about 10 p. m. of the 20th, the rainfall amounting to over three inches. Growing corn in many parts of the county was blown down, and wheat was also damaged.

Cleveland, Ohio: the steam barge "P. H. Walters" was sunk off Black River, Ohio, during a severe squall on the evening of the 20th.

Raleigh, N. C.: during the prevalence of a severe thunder-storm on the 20th there was a fall of hail about four miles north of this place, causing considerable damage to the cotton and corn crops. The path of the hail belt was about one mile wide, within which the cotton was stripped of its leaves and corn badly torn.

Henderson, Vance Co., N. C.: during the night of the 20th-21st quite a severe storm passed through the "Bear Pond" section of this county; houses, fences, and trees were blown down.

Mr. L. J. Heatwole, voluntary observer at Dale Enterprise, Rockingham Co., Va., furnishes the following report of a storm which occurred at that place:

At 4.30 p. m. on the 20th a dark, ominous looking cloud was seen forming high up in the western sky, and was accompanied by a loud roaring noise, which resembled that made by an approaching railroad train. It apparently remained stationary for about forty minutes and then drifted slowly eastward, at which time began a tremendous downpour of rain and some hail. The bulk of the storm passed just to the south of this point, and to all appearances the wind came in a direction downward and outward from the sides of the cloud, with a force so great as to destroy much fencing and timber, and also to overturn wind-engine towers and buildings along its track. At this station the wind blew a heavy gale from the south and southeast, while two miles to the south, on the opposite side of storm, the current was so violent from the north and west as to completely demolish a large barn. The lightning was sharp and

frequent; in one instance a barn eight hundred yards or more from the station received a heavy discharge of lightning that killed two horses in the stables.

New Orleans, La.: on the 20th thunder-storms prevailed from 2.20 to 6.15 p. m., and from 8.10 to 9 p. m. The rainfall, amounting to 5.00 inches, which accompanied this storm flooded a large part of the city and caused much damage. The rainfall was the heaviest that has occurred since April 7, 1883.

Lenoir, Caldwell Co., N. C.: a destructive hail storm occurred in this vicinity on the 21st; the hail-stones were as large as hens' eggs and caused great damage to crops.

Rock Hall, Kent Co., Md.: a storm of unusual severity, accompanied by hail, occurred in this vicinity during the night of the 21st-22d, causing much damage to orchards, crops, and other property.

Petersburg, Dinwiddie Co., Va.: a storm, reported to have been the most severe experienced for many years, passed through Amelia and Nottoway counties on the 22d. Dwellings were unroofed, and out-buildings, fences, and trees were blown down. In Dinwiddie county crops were severely injured by a heavy fall of hail.

Salisbury, Wicomico Co., Md.: a violent storm occurred in this vicinity at about 9 p. m. on the 22d. Much damage was done by the very heavy rainfall and high wind.

Wilmington, Del., 22d: two storms of unusual violence occurred here during the early morning of the 22d, the more violent coming from the southwest. Many trees, chimneys, and light structures were blown down, and several buildings were unroofed. Great damage was done to telegraph and telephone wires.

Philadelphia, Pa.: thunder-storms occurred during the early morning and afternoon of the 22d and continued during the night of the 22d-23d. Rain fell at intervals during this time, but at 7.45 p. m. a steady downpour set in and continued during the night, the rainfall amounting to 3.63 inches, which is remarkably heavy for this station.

Valentine, Nebr.: on the 26th a thunder-storm began at 6.45 p. m. and continued until 8.45 p. m.; hail fell for five minutes, beginning at 7 p. m. The wind attained a very high velocity; for two and one-half minutes it blew at the rate of one hundred and fifty miles per hour. The roofs were blown from several buildings and a number of frame structures were blown down.

WATER-SPOUTS.

Captain Frank, of the s. s. "Taormina," reports having observed two water-spouts on June 21st, in N. 41° 20', W. 61° 28', at noon.

First Officer James Ryley, of the s. s. "Lampasas," Captain Crowell, commanding, reports having observed three water-spouts June 26th, in N. 33° 00', W. 77° 50', at noon.

COTTON REGION REPORTS.

In the following table are given the means of the maximum and minimum temperatures, and the average rainfall for the cotton-belt districts during the month. For the purpose of comparison the means for the five preceding years are also given.

Generally the rainfall is deficient in all districts, the departures ranging from 0.58 inch in the district of Vicksburg to 3.13 inches in the district of Charleston, while they exceed two inches in the districts of Atlanta, Little Rock, Memphis, Montgomery, and Savannah; in the district of Galveston a small excess occurs.

The mean maximum temperatures are above the average in all districts, except in the districts of Galveston and Little Rock, which show slight departures below the average. The mean minimum temperatures are slightly below the average in all districts, except for the district of Galveston, where a small excess occurs.

A comparison of the means of the maximum and minimum temperatures shows that the absolute range of temperature during June, 1887, in the southern sections of the country was greater than the average of previous years.

Temperature and rainfall data for the cotton districts, June.

Districts.	Rainfall.			Temperature.							
	Average for June of five preceding years.	Average for June, 1887.	Departures.	Maximum.				Minimum.			
				Mean for June of five preceding years.	Mean for June, 1887.	Departures.	Mean for June of five preceding years.	Mean for June, 1887.	Departures.	Extremes for June, 1887.	
										Max.	Min.
New Orleans...	Inch. 5.90	Inch. 5.27	— 0.63	90.5	91.0	+ 0.5	70.5	68.6	— 1.9	101	57
Savannah	6.28	3.91	— 2.37	89.7	90.6	+ 0.9	69.6	68.2	— 1.4	104	48
Charleston	6.54	3.41	— 3.13	88.3	90.2	+ 1.9	67.4	66.0	— 1.4	105	44
Atlanta	5.61	3.56	— 2.05	87.0	89.1	+ 2.1	66.0	65.2	— 0.8	104	42
Wilmington	5.59	3.98	— 1.61	87.2	88.4	+ 1.2	65.2	64.4	— 0.8	109	42
Memphis	4.90	2.54	— 2.36	87.4	88.9	+ 1.5	66.5	63.7	— 2.8	102	44
Galveston	2.58*	3.27	+ 0.69	92.1*	91.4	— 0.7	70.2*	70.3	+ 0.1	103	58
Vicksburg	4.19	3.61	— 0.58	89.9	91.3	+ 1.4	69.2	69.0	— 0.2	101	52
Montgomery	5.25	2.84	— 2.41	89.2	90.2	+ 1.0	67.5	66.9	— 0.6	104	47
Augusta	5.61	3.85	— 1.76	88.6	91.0	+ 2.4	66.9	66.4	— 0.5	105	48
Little Rock	3.37	1.26	— 2.11	89.1	88.6	— 0.5	65.9	64.9	— 1.0	100	43
Mobile	4.78	3.79	— 0.99	91.0	91.6	+ 0.6	69.7	65.4	— 4.3	105	46

*Average for June of four preceding years.